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ABSTRACT

Careful use of technology in education may enhance the ability of the nursing education profession to educate nurses for practice, prepare future nurse educators, and advance nursing science. To take full advantage of technology, several factors must be addressed. Superior distance education programs require substantial institutional financial investment, and program developers must consider coordination of services, hardware requirements, and ways to lower costs across state lines. Questions of intellectual property and copyright cannot be ignored. Technology-mediated teaching strategies can change the way teaching and learning occurs, and these strategies may change conventional thinking about how the quality of educational programs is assessed. It is already apparent that distance education technology has provided some nursing schools an advantage in recruiting students and is increasing competition among institutions. An appendix contains guidelines for the use of distance technology in nursing education. (Contains 16 references.) (SLD)

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AACN White Paper: Distance Technology in Nursing Education

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Publications

AACN White Paper: Distance Technology in Nursing Education

Assessing a New Frontier

The American Association of Colleges of Nursing (AACN) recognizes that technological advances are increasing opportunities to improve dramatically the quality of and access to nursing education. Further, technology affords increased collaboration among nursing faculties in teaching, practice, and research. Careful use of technology in education may well enhance the profession's ability to educate nurses for practice, prepare future nurse educators, and advance nursing science in an era when the number of professional nurses, qualified nurse faculty and nurse researchers is well below national need.

To take full advantage of technology in education, several factors need to be addressed by nursing and other leaders in education and health care institutions, as well as by external funders and policy makers:

- Superior distance education programs require substantial institutional financial investment in equipment, infrastructure, and faculty development.
- Local, regional, and national planning for multi-site communications need to consider coordination of services, compatibility and progressive upgrading of hardware, as well as policies that lower transmission costs within and across state lines.
- The use of distance technology and in particular, Web-based media, has raised questions regarding intellectual property and copyrights, privacy of educational dialogue, and other related legal and ethical issues that require continued clarification.
- Technology-mediated teaching strategies can change dramatically the way teaching and learning occurs, challenging the traditional relationship of students to academic institutions. These strategies may change conventional thinking about how quality of educational programs is assessed and what is required to support student learning (e.g., library access, counseling services, computing equipment, tuition, and financial aid).
- Distance education technology has provided some nursing schools an advantage in recruiting students and is increasing competition among institutions.

Definitions

Distance education -- a set of teaching and/or learning strategies to meet the learning needs of students separate from the traditional classroom setting and sometimes from the traditional roles of faculty (Reinert & Fryback, 1997). Distance education requires that teachers and learners are separate from each other. This definition excludes activities where the teacher travels to an alternative site for delivery of traditional courses or classes.

Distance education technologies -- the technical support and methods necessary to teach students who physically may not be in the same location as the teacher. These technologies encompass a variety of content-delivery methods, including audio conference by telephone, audiocassette tape, videotaped instruction, courier service, electronic mail (e-mail), faxing, fixed computer media (CD-ROM and floppy disk), Internet list-serves, room-based video conference (interactive television), desktop video conference, and World Wide Web (Internet-based programming) (Baldwin, Bingham, & Connors, 1996). Many of these technologies are also used in nursing education to complement traditional classroom teaching.

Background

The influence of educational technology on higher education

The burgeoning of technological advances to deliver educational course work is revolutionizing higher education. The advent of technology has expanded the capacity of educational institutions to reach far beyond their own geographic areas. The increased use of technology in education may improve access to and may ultimately lower the costs of education. But technology is also revolutionizing existing assumptions about what constitutes quality in education, faculty and student relationships to academic institutions, local and state funding of higher education, and the role of research, practice, and service missions in academia.

Several forces are converging rapidly to influence higher education:

- *First, business sectors related to technology (e.g., telecommunications, software, multi-media experts) are growing to capitalize on the current and perceived increase in demand for educational technologies.* Venture capitalists are investing significantly in these companies. Thus, the availability of new methods to deliver education both on and off "campus" is expanding rapidly. This availability is lowering the cost of new educational technologies but also imposing obsolescence on existing systems for which educational institutions have invested heavily. Moreover, the costs of the infrastructure needed to support educational technology are high and being born by academic institutions whose resources have declined over past decades and who have competing capital cost demands.

- *Second, the growth in distance education programs in nursing is fostering competition for students and faculty beyond traditional geographic boundaries.* The notion that students and faculty are aligned with one institution for their academic life is changing. The potential of students taking core coursework at multiple institutions for credit through distance learning is now possible. The ability of faculty to work for a traditional university and also teach in "virtual universities" is also now possible. Many universities and schools of nursing are

now engaged in an internal dialogue about the meaning of student "residency" requirements and faculty conflicts of interest.

- *Third, institutions that devote resources to educational technologies are able to meet student demands for high flexibility in education.* Thus, institutions of higher education with flexible technological capacity are favorably positioned in this market. This is especially true as the most expert faculty, teaching through technology, can reside anywhere geographically and be drawn from the practice and academic arenas. Many of these faculty have expertise developed within and supported by traditional higher education institutions, their full-time employers, yet they also teach in "virtual universities." In nursing, support of research and practice is threatened by this growing phenomenon of dual faculty allegiance, since overhead costs for these two components of the university mission are high even with external funding for research and practice. Allocating resources equitably among these missions is difficult when competition for students demands rapid and significant investments in distance education programming. As states realize the expanding geographic reach that technology offers, they will likely re-evaluate where responsibility lies for supporting higher education and all aspects of the academic mission.

- *Fourth, nursing is experiencing workforce depletion in both the practice and academic arenas.* By the year 2015, the Division of Nursing of the U.S. Department of Health and Human Services projects that 114,500 full-time equivalent (FTE) jobs for RNs will remain vacant (National Advisory Council on Nurse Education and Practice, 1996). In 1998, several regions of the country already had reported a nurse shortage especially in acute-care specialty settings (Chandler, 1998; Hawke, 1998). These vacancies are not likely to be filled without augmenting the number of professional nurse graduates per year. In addition, the National Advisory Council on Nurse Education and Practice (1996, p. 9) recommends that a federal policy be adopted to achieve a basic nurse workforce in which at least two-thirds hold baccalaureate or higher degrees in nursing by the year 2010. Only 39 percent of the current registered nurse population have a baccalaureate in nursing or higher degree (U.S. DHHS, HRSA, BHP, DON, 1997). Historically, distance education has increased access to education (Selingo, May 1998). Therefore, the use of technology is a significant means to increase access to education for adult, working students who represent a growing proportion of the undergraduate nursing population. Nursing also is experiencing an "aging professorate" as are other disciplines (AACN, 1998). However, the problem in nursing is exacerbated by an already limited pool of qualified faculty for baccalaureate and higher-degree education. The use of technology in higher education may provide an opportunity to increase the number of faculty-qualified nurses to support education, research, and practice.

- *Finally, reliance on educational technology poses questions about the relationship of the learning milieu to the social and behavioral skills needed in a humanistic, practice-oriented discipline.* For example, can students learn to relate well in a multi-disciplinary environment when their dominant educational experiences have been technology-based, essentially isolated from classmates and teachers except for telecommunications? Technology offers the opportunity to package courses that match learning objectives, content, and

styles in ways never before possible. It is likely that some content, such as development of behavioral skills, will continue to occur in traditional ways but with increased flexibility to better match learner needs.

Effect of distance programs on educational quality and cost

The gold standard of educational quality has been the outcomes achieved with traditional classroom learning. The results of 248 studies reviewed by Russell (1998) conducted from 1928-1997 demonstrate no significant differences in learning outcomes of students taught by traditional classroom methods versus distance educational methods. This literature indicates that distance education methods do not negatively affect quality of outcomes. However, this literature also suggests that greater precision in outcome measurement is needed to determine differences among teaching methods. Further, future studies need to assess more clearly the relationships among content type, teaching method, learner characteristics, and educational outcome.

The wide range of possible distance-education delivery methods makes general cost estimation difficult. Regional and local differences in costs for computers, communications hardware, and human resources preclude generalizations. Each school of nursing will need to explore its own needs and resources to determine how and to what extent it will deliver education via distance technology. Resources to be evaluated include available capital, equipment, faculty, instructional design support and instructional technology support. Initial investments for distance education and its infrastructure are expectedly high. However, once the delivery methods are in place, many of these costs can be offset by higher tuition rates and lower delivery costs. Partnerships should be explored with local businesses and other training/education companies who also want to enter the distance education arena. Sharing costs with other departments in the institution should be fostered, together with seeking external grant monies for increasing technological access to higher education.

Influence of educational technology on intellectual property and copyright

Intellectual property and copyright laws, policies, and procedures have been influenced by the increased use of technology in education. Surrounding issues are of critical importance for delivering technology-based educational course work. Intellectual property is the ownership of ideas and the control over the tangible or virtual representation of these ideas. Copyright is a form of protection provided by the laws of the United States (title 17, U.S. Code) to authors of original works, including literary and other intellectual works (U.S. Library of Congress, 1999). The Digital Millennium Copyright Act (1998) implements the World Intellectual Property Organization copyright protection treaties and limits liability for online copyright.

Policies and procedures on intellectual property and copyright in educational coursework should be developed and maintained. For example, the State of Kansas Intellectual Property Policy (1998) includes a general copyright policy covering mediated courseware and copyrightable software. If intellectual property and copyright issues are resolved, faculty with expertise in developing technology-based educational coursework, the institutions for which they work, and learners will all benefit.

Distance education and student financial aid

Consideration of the effects distance education will have on student financial support is critical. Financial aid for distance education students is currently under re-evaluation by lawmakers. Legislation is being drafted to extend the Higher Education Act for students in distance education programs and courses. Until this legislation is finalized, the current regulations for financial aid are enforced. (An overview of the proposed legislation can be located in an article by Jeffrey Selingo in The Chronicle of Higher Education, June 5, 1998, pg. A30.)

Federal financial aid regulations and guidelines do allow students who complete distance education courses or programs to be eligible for Student Financial Aid (SFA). However, to maintain student eligibility, the academic institution must assume responsibility to ensure that it does not offer more than 50 percent of all its course offerings through distance education nor enroll more than 50 percent of its students in distance education courses. This rule applies to the university as a whole, not to individual units of the university (Higher Education Act, 34 CFR 600.7). According to the regulations, the aggregate of all eligible programs or students will be considered. If institutions keep within the limitations of the regulations, student access to federal SFA loans is possible.

Financial aid regulations also make it necessary to develop processes that allow maximum benefit to the students, yet meet regulatory requirements. Regulations require documentation of attendance. The question becomes how to document attendance for self-paced or online courses. To resolve these issues, institutions need to develop processes that provide mechanisms to comply with regulations. For example, attendance in online courses can be documented by requiring students to log on and post relevant comments a given number of days out of every seven. The faculty member then tracks attendance on a weekly basis according to such a definition.

Complying with financial aid regulations requires institutions to think outside of traditional academic practices. Questions such as how credit for online courses is allocated when there is no standard "seat time" are issues that need to be defined by each respective institution. The institution's governing bodies should ratify proposed regulations and definitions to ensure compliance for students in those courses or programs.

Planning is critical in delivering distance education courses. Without proactive planning, students are put at risk for losing financial aid or transfer credit to other institutions, in addition to other negative policy implications.

Conclusion

This white paper addresses the many issues that have emerged regarding the use of technology in distance education in nursing. AACN encourages continued clarification of student financial aid status, intellectual property and copyright, confidentiality and other legal and ethical issues related to the use of distance technology. Additionally, nursing leaders need to support increased funding and development of infrastructure conducive to high-quality transmission of

technology-mediated courses. Increased funding also is needed for faculty development and student supports, and for the development of studies investigating the quality, cost, and efficiency of distance education programs in nursing. This white paper has discussed recommended steps toward the resolution of these issues.

In view of the importance of technology to nursing education, and the many factors that must be addressed to fully utilize technology to advance nursing education, AACN believes the following issues must be further addressed:

1. Strategies to increase nurses' access to education through technology.
2. Increased funding for programs, infrastructure, and superstructures that accommodates the substantial financial investment that superior distance education requires.
3. Increased funding for the rigorous evaluation of distance education programs using standards of nursing higher education.
4. Creation of proactive plans by schools and institutions for infrastructure development, resource allocation, and faculty development for the implementation of new distance education programs.
5. Development of local, regional, and national planning agenda for multi-site communications, including but not limited to coordination of services, compatibility and upgrading of hardware, as well as policies that lower transmission costs within and across state lines.
6. Continued examination and clarification of legal and ethical issues related to distance technology by appropriate regulatory agencies. Where appropriate, these issues should include development of laws and policies that provide better protection of intellectual property, copyright, and privacy of individuals and institutions.
7. Creation of nursing school policies regarding intellectual property, copyright, privacy of educational dialogue, and other legal and ethical issues prior to the development of distance education programs.
8. Continued definition and clarification of what constitutes a distance education program for the purposes of financial aid qualification and accreditation.
9. Development of studies that clarify the costs and efficient use of technology in nursing education.
10. Continuing education of nursing faculty in the area of distance education and the use of technology in education.
11. Development of technology-mediated programs within the context of a broad strategic and mission planning perspective rather than for the short-term advantage of student recruitment.
12. Use of technology to promote quality nursing education through collaboration

among institutions and sharing of schools' specific niche expertise.

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Appendix

Guidelines for the Use of Distance Technology in Nursing Education

Guidelines for the use of educational technologies are available with general applications to higher education and kindergarten through 12th grade (American Council on Education, 1996). While these and other publications are helpful for academic administrators interested in distance education initiatives, few references are available that address issues specific to nursing education. The following guidelines provide the foundation for development of standards to support distance education programs in nursing. Considered issues include planning, technology infrastructure, faculty development, student support, and evaluation of outcomes.

Planning

The changing demographics of today's nursing students increase the need for careful planning of all curricular and teaching changes. Issues of ethnic diversity, part-time and working students, study-time constraints, student parents, as well as geographic distance, must be considered as schools and universities decide to enter the distance education arena. Initiation of technology-based courses and programs can be costly in faculty time and financial resources. Clear direction for the future is a necessary foundation for planning. Faculty and administrators must understand why they are involved in distance education and must be committed to strategic planning for accomplishing well thought-out goals.

Questions that should be addressed during planning include:

1. What is the purpose of distance education for this school or university?
2. Which students and how many will benefit from distance education offerings?
3. What should be accomplished in the short-term and long-term, e.g. one year, five years, and ten years?
4. What will be the financial impact of distance education on other programs of the school or university?
5. What is the availability of support systems for educational technologies within the university, city, or state?
6. What options exist for collaboration with other schools or universities for distance education programs?

Since educational technologies are likely to change rapidly in the next decade, it is imperative to consider the benefits of distance education versus the high cost of this investment. Most schools with successful distance education programs began with limited course development targeted at particular groups of students. The use of technologies has increased access to nursing education for these select students. Currently, numerous graduate courses in advanced practice nursing are available through distance education, as well as some undergraduate and associate-degree

courses.

Technology infrastructure

Faculty and administrators planning for distance education must consider the technology infrastructure necessary to support the goals of this kind of program. Depending on the type of technology used, the technical requirements for development of distance education modalities may be expensive and are often complicated. Therefore, it is difficult for a single school within a university to establish an adequate technology infrastructure. Support is necessary from experts in information technologies from other units of the university or from external sources. This is especially important for interactive television or videoconferencing and for World Wide Web or Internet distance education programming.

Questions that should be addressed when considering technology infrastructure include:

1. What institutional facilities and equipment are available to support interactive television and World Wide Web or Internet teaching? For examole, such facilities include faculty computers and access to software, networking support across the school and university, server capability, classroom equipment (e.g. computers, video cameras, and monitors), Internet access, telephone line network, state or regional education network for telecommunications, videoconference availability, or academic support services?

2. What nursing education resources can be dedicated to distance education development and maintenance?

3. What equipment should students be required to buy? Or, how will students get access to necessary equipment and classrooms at distant sites or on-campus?

4. What collaborative partnerships can be developed to increase nursing educators' access to necessary technology infrastructure?

The cost of establishing the technology infrastructure for distance education is significant. Both up-front single investment and annual investments are needed to implement and maintain this infrastructure.

Faculty development

Nursing faculty have developed some of the most creative interactive television and World Wide Web courses currently available to students in any profession. While most faculty are comfortable with traditional classroom teaching, some individuals in nursing are leading the field of distance education in the health professions. Creativity, flexibility, and willingness to learn new teaching methods are necessary for faculty engaged in distance education. Formal reward mechanisms are needed which recognize faculty efforts in developing new distance curricula. Good technology-based teaching requires investment of time and learning for faculty. Innovations in teaching should merit appropriate consideration by promotion and tenure committees, along with traditional criteria for recognition.

Questions that need to be addressed related to faculty development for distance education include:

1. What faculty individuals or groups are most suited to conduct distance education? Should all faculty participate equally?

2. What resources are available to support faculty development in educational technologies? For example, such resources include convenient classes for computer literacy, classes or learning options for teaching with educational technologies, technological support personnel available to faculty, nurse experts in information technologies, time availability for course development, and good equipment and software.

3. What instructional design methods will be used for each type of educational technology? For example, will interactive television classes take full advantage of the "interactive" capabilities, how will the typical World Wide Web course be structured and supported with links to other sources of information, and how can faculty help each other gain expertise in course design and presentation?

Part of the success of any educational program is the support and direction of leadership. Distance education requires not only educational innovation but also an environment that rewards risk-taking. New technologies afford many opportunities for innovation. But faculty engaged in distance education face many challenges that may result in some failures. Administrators must support new teaching endeavors with resources, recognition, and understanding of productivity and workload issues.

Student support

There are many considerations for the learner in distance education. While technology-based methods for education are ubiquitous in our culture, not all students are ready for non-traditional courses. Learning that occurs in relative isolation from the traditional classroom requires motivated, committed students. When new technologies are used, there must be adequate student support systems. Nursing students are usually quite willing to attempt new approaches to learning, but have little patience with ineffective or unreliable technologies. Fortunately, nursing students often expect to learn computer skills as a basic competency for contemporary clinical practice. As with traditional nursing courses, didactic knowledge must be aligned successfully with clinical experience in nursing.

Questions that should be addressed related to student support include:

1. What systems are in place or can be developed to support students at distant sites? What non-curricular supports (e.g., academic advising, tutors, physical and mental health services, and recreation opportunities) are available to students enrolled in distance education? How does the relative availability of these other support services influence the quality of the student's educational experience?

2. What computer equipment and software will be required of students? What interactive television sites and technical support at these sites will be available

for students?

3. What will be the structure of distance education courses or programs? Will students be required to visit the main campus for any part of the program or course?

4. What options can be arranged for student clinical experiences at distance education sites? How will faculty be involved with all aspects of distance education programs?

5. Does the school and university have systems to support financial aid and scholarships for students enrolled in distance education programs?

Evaluation of outcomes

Evaluation provides the feedback necessary to assess the value of the technology and the performance of faculty and technology included in the educational delivery system. Changes or adjustments in content delivery methods, technical support, or resources for distance education students should be made in a timely manner to ensure positive outcomes for students and faculty. Evaluation should include both quantitative and qualitative factors (Bevis, 1989). A comprehensive evaluation plan includes the use of tested and reliable measures. A comprehensive monograph prepared by Sparks and Kuenz (1993) provides a rich resource of such measures.

Questions that should be addressed during evaluation include:

1) Is the quality of distance education programming or courses the same as for traditional instruction?

2) Are the expected outcomes for distance education students the same as for traditional students?

3) How will faculty ascertain the impact of distance education of nursing students on clinical care of patients?

Related AACN Documents

Distance Learning is Changing and Challenging Nursing Education
(AACN Issue Bulletin - January 2000)

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